Sexual Orientation, Sexual Abuse, and HIV-Risk Behaviors Among Adolescents in the Pacific Northwest

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Objectives. We explored HIV risk behaviors, sexual orientation, and sexual abuse among 5 school-based cohorts in Seattle, Wash (SEA95 and SEA99:N = 7477 and N = 6590), and British Columbia (BC92, BC98, and BC03 [weighted]: N = 239 975, N = 281 576, and N = 265 132).

Methods. An HIV risk scale of 7 items assessed risky sexual behaviors and injection drug use. Self-identified sexual orientation included heterosexual, bisexual, gay/lesbian, and, in British Columbia only, mostly heterosexual. Analyses of covariance were conducted separately by gender and were adjusted for age and sexual abuse when comparing means.

Results. Gay/lesbian and bisexual adolescents had higher mean age-adjusted risk scores compared with heterosexual and mostly heterosexual adolescents. After we controlled for sexual abuse history, mean scores were 2 to 4 times higher among abused students than among nonabused students in each sexual orientation group. Age/abuse-adjusted models better explained the variance in risk scores (R^2 = 0.10–0.31), but sexual orientation remained an independent predictor.

Conclusion. Sexual minority adolescents who attended school reported higher HIV risk behaviors, and higher prevalence of sexual victimization may partially explain these risks. (*Am J Public Health.* 2006;96:1104–1110. doi:10.2105/AJPH.2005.065870)

HIV infection, which is often acquired during adolescence, is a worldwide public health concern.[1,2] Although the overall prevalence of HIV among US and Canadian adolescents is low, gay/lesbian and bisexual adolescents are disproportionately more likely to acquire HIV. Adolescent and young adult men who have sex with men are the largest group diagnosed with HIV in the United States, especially among racial/ethnic minority youths.[3] As early as 1992, a school-based province-wide survey of adolescent health in British Columbia found that 42% of adolescents who reported having been diagnosed with HIV identified a gay, lesbian, or bisexual orientation. A 1994 survey of street youths in Vancouver, British Columbia, found that 4 out of 5 youths who reported a seropositive status also self-identified as gay/lesbian or bisexual.[4,5]

A number of behaviors increase the risk for HIV, including risky sexual behaviors and injection drug use, and some populations of adolescents are more likely to be taking these risks. For example, adolescents who have a history of sexual abuse or assault are significantly more likely than nonabused adolescents to have an early sexual intercourse debut, engage in unprotected intercourse, have multiple sexual partners or be involved in prostitution or survival sex, become pregnant, and use illicit substances, including injection drug use.[6,7] Other studies have found that gay/lesbian and bisexual adolescents have an increased risk for sexual victimization compared with heterosexual adolescents.[8–14] Most of these studies also document a higher prevalence of HIV risk behaviors among gay/lesbian and bisexual teenagers, including earlier age of sexual intercourse debut,[8–10,13,15,16] more lifetime and recent sexual partners,[8,13,15] equal or greater levels of unprotected sexual intercourse,[9,10,13,17] pregnancy involvement (as a marker for unprotected intercourse),[9,15,18] and injection drug use.[8,10] Some of these studies suggest that gay/lesbian and bisexual adolescents may engage in HIV risk behaviors as a way of coping with sexual orientation stigma and sexual violence they may experience.[8–10,15]

Although documented female-to-female transmission of HIV is extremely rare, lesbian and bisexual adolescent girls may not engage in exclusively same-gender sexual behavior. In several studies, they were as likely as heterosexual girls to report other-gender sexual experience,[4,9,12,17] and they were more likely to have been pregnant (an indicator of unprotected heterosexual intercourse).[9,12,18] However, describing gay/lesbian and bisexual adolescents as a single category can mask differences between bisexual adolescents and gay/lesbian peers.

Research has found gender differences in HIV risk behaviors among both heterosexual, gay/lesbian, and bisexual adolescents,[17,19,20] but it also may be important to disaggregate sexual orientation groups and gender when studying HIV risk behaviors. Some studies have documented a higher prevalence of HIV risk behaviors among bisexual adolescents compared with gay/lesbian peers. Rotheram-Borus et al.[17] found that bisexual teenagers from New York City; San Francisco, Calif; and Los Angeles, Calif, reported the highest rates of sexual risk behaviors compared with their gay/lesbian and heterosexual peers. Similarly, in a recent analysis of health-related behaviors among urban gay/lesbian and bisexual adolescents, Rosario et al.[21] found that girls who self-identified as bisexual rather than lesbian reported more episodes of unprotected vaginal and oral sex. Among adolescent males in Massachusetts, Goodenow et al.[10] found that those who reported bisexual experience also had a much higher risk for multiple sexual partners, unprotected intercourse, sexually transmitted disease (STD), and injection drug use than males who reported either exclusively same-gender or exclusively other-gender sexual partners. Among college students in a national study,[22] young adults who had both-gender partners were more likely to report multiple sexual partners in the past few months, and males who had exclusively same-sex partners were less likely to use condoms consistently.

Currently, much of the research on HIV risk behaviors among gay/lesbian and bisexual adolescents has been restricted to venue-based samples.[5,13,17,21] These studies may not adequately represent the behaviors of all gay/lesbian and bisexual teenagers in those regions, including those who do not publicly self-identify as gay/lesbian or bisexual. Recent population-based studies have reported HIV-related risk behaviors from adolescents on the East Coast[10,12] and in the Midwest,[9,15] where the predominant racial/ethnic minority groups differ from those in the Pacific Northwest of the United States and Canada. To date, the only published study that examined HIV risk behaviors among adolescents by sexual orientation in the Pacific Northwest was a venue-based study of homeless youths in Seattle, Wash.[13]

Our goal was to compare the prevalence of individual HIV risk behaviors and combined risk behavior scores among adolescent students in the Pacific Northwest who identified their sexual orientation in surveys of 5 population-based cohorts. Four hypotheses guided our study: (1) males would have higher HIV risk scores compared with female youths; (2) bisexual adolescents would have higher HIV risk behavior scores compared with heterosexual adolescents, and bisexual students' scores would be equal to or higher than the scores of their gay/lesbian peers; (3) sexually abused adolescents of any sexual orientation would have higher risk scores compared with their peers, but bisexual and gay/lesbian adolescents would be more likely to report a history of sexual abuse; and (4) these associations would be significant among all 5 cohorts.

TABLE 1—Demographics of the 5 Cohorts: British Columbia (1992, 1998, 2003) and Seattle, Wash (1995, 1999)

	BC92	BC98	BC03	SEA95	SEA99
Sample size	239 975[a]	281 576[a]	265 132[a]	7477	7830
School grade range	7–12	7–12	7–12	9–12	9–12
(ages, y)	(<12–≥19)	(<12–≥19)	(<12–≥19)	(14–18)	(14–18)
Female, %	50.5	52.6	50.4	51.0	51.3
Sexually active, %	30.9	23.9	24.6	44.8	40.6
Sexual orientation, %					
Heterosexual	92.5	91.6	90.8	95.6	96.1
Mostly heterosexual	5.5	6.2	6.6	…	…
Bisexual	1.7	1.6	2.1	3.4	3.2
Gay/lesbian	0.3	0.6	0.5	1.0	0.7

Note. BC92 = British Columbia, 1992; BC98 = British Columbia, 1998; BC03 = British Columbia, 2003; SEA95 = Seattle, 1995; SEA99 = Seattle, 1999.
[a]Weighted to provincial enrollment and adjusted for cluster sampling and differential response rates.

METHODS

Design

We used the 1992, 1998, and 2003 British Columbia Adolescent Health Surveys (BC92, BC98, BC03) and the 1995 and 1999 Seattle Teen Health Surveys (SEA95, SEA99)—anonymous school-based surveys of adolescent health and risk behaviors—to conduct secondary analyses. The British Columbia Adolescent Health Surveys were cluster-stratified random samples of students in grades 7 through 12 who attended public schools throughout the province; these samples were weighted to provincial enrollment. In Seattle, all students in grades 9 through 12 who attended public high school on the survey days, including students in alternative schools, completed the Seattle Teen Health Surveys. Passive parental consent and student assent were obtained for participation in the Seattle surveys; both passive and active parental consent were obtained in British Columbia, where approximately 25% of the school districts required active parental consent.

We included only students who self-identified as gay/lesbian, bisexual, mostly heterosexual (an option only in British Columbia), or heterosexual in our analyses (BC92: N=239 574; BC98: N=281 576; BC03: N=265 132; SEA95: N=7477; SEA99: N=7830). Students who did not answer the sexual orientation question or who selected "not sure" (6.1%–9.7% in BC; 9.6%–11.0% in Seattle) were excluded because of response set bias issues and heterogeneity among unsure students (details about the missing and not sure have been published elsewhere[23]). Demographics of the cohorts are shown in Table 1.

Instruments and Measures

The British Columbia Adolescent Health Surveys were derived from the Minnesota Adolescent Health Survey of 1986,[24] with additional items taken from the Youth Risk Behavior Survey[3] and other sources. The Seattle Teen Health Surveys were derived from the Youth Risk Behavior Survey and included an additional measure to assess sexual orientation. Details about the sexual orientation measures for these surveys have been published elsewhere.[23]

Seven HIV risk behaviors common to all 5 surveys were combined into an HIV-risk score: (1) ever having used injection drugs; (2) age at sexual intercourse debut; (3) number of sexual partners during the past 3 months; (4) number of lifetime sexual partners; (5) condom use during last sexual intercourse; (6) previous history of an STD diagnosis; and (7) alcohol or drug use during last sexual intercourse (SEA99 did not include the last item) (Table 2). Cross-tabulations and χ^2 tests compared the prevalence of each risk behavior between sexual orientation categories separately by gender. Each item's response options were then standardized on a 100-point continuous scale, and an HIV risk score was calculated from a mean of the responses, with at least 6 of the 7 items needed to receive a risk score. Students who answered fewer than 6 items did not differ from those who answered 6 or more items in terms of demographics (i.e., gender, age, grade, or family structure) or in prevalence of unrelated behaviors (e.g., suicide attempts or school performance).

Analysis

Because of gender differences in the prevalence of risk behaviors—including differences between gay/lesbian and bisexual adolescents[17,20]—all analyses were conducted

TABLE 2—HIV Risk Scale items and Scoring: British Columbia (1992, 1998, 2003) and Seattle, Wash (1995, 1999)

Item	Definition and Range of Responses	Standardized Scoring for Scale
	British Columbia surveys	
Age at sexual debut	Age first time had sexual intercourse (sexual intercourse was not defined, only clarified with a parenthetical "going all the way"). Response options included "never had sex" and 6 items from "12 or younger" to "17 or more years old"	Never had sexual intercourse = score of 0 ≤ 12 = score of 100 All other responses assigned scores at equal intervals ranging from highest at younger age to lowest at older age
No. of sexual partners during past 3 months	Never had sexual intercourse; had sexual intercourse but not during past 3 months; 1, 2 people; ≥ 3 people	Never/no partners past 3 months = score of 0 ≥ 3 = score of 100 Other responses assigned scores between
No. of lifetime sexual partners	Never had sexual intercourse; 1, 2, 3–5 people; ≥ 6 people	Never = score of 0 ≥ 6 = score of 100 Other responses assigned scores between
Condom used during last sexual intercourse	Used a condom or other latex barrier	Never had sex or yes = score of 0 No = score of 100
Ever diagnosed with an STD	Told by doctor or nurse that you had an STD (list of 7 STDs), including HIV	No = score of 0 Yes = score of 100
Ever used injection drugs	Injected an illegal drug with a needle: included 0, 1–2, and ≥ 3 times	0 times = score of 0 ≥ 1 times = score of 100
Substance use during last intercourse	Used alcohol or drugs before most recent sexual intercourse	No or never had intercourse = score of 0 Yes = score of 100
	Seattle surveys	
Age at sexual debut	(Sexual intercourse was defined in the instructions as "vaginal or anal intercourse between any two people")	Never had sexual intercourse = score of 0 ≤ 12 = score of 100 All other responses assigned scores at equal intervals ranging from highest at younger age to lowest at older age
No. of sexual partners during past 3 months	Never had sexual intercourse; had intercourse but not during past 3 months; 1–5 people; ≥ 6 people	Never/no partners during past 3 months = score of 0 ≥ 6 = score of 100 All other responses assigned scores at equal intervals between
No. of lifetime sexual partners	Never had sexual intercourse; 1–5 people; ≥ 6 people	Never/no partners during past 3 months = score of 0 ≥ 6 = score of 100 All other responses assigned scores at equal intervals between
Condom used during last intercourse	Condom use last time you had sexual intercourse	Never had sex or yes = score of 0 Did not use = score of 100
Ever diagnosed with an STD	Ever told you had an STD	No = core of 0 Yes = score of 100
Ever used injection drugs	Lifetime frequency of use: 0, 1–2, ≥ 3 times; dichotomized to 0 and ≥ 1	0 times = score of 0 ≥ 1 times = score of 100
Substance use during last intercourse	Used alcohol or drugs last time you had sexual intercourse (not available SEA99)	No = score of 0 Yes = score of 100

Note. BC92 = British Columbia, 1992; BC98 = British Columbia, 1998; BC03 = British Columbia, 2003; SEA95 = Seattle, 1995; SEA99 = Seattle, 1999; STD = sexually transmitted disease.

separately by gender and were compared between bisexual, gay/lesbian, mostly heterosexual, and heterosexual groups. To control for both possible maturational effects associated with some behaviors and differences in age distributions among orientation groups, we used analysis of covariance (ANCOVA) to test differences in mean HIV risk scores by sexual orientation within all 5 cohorts, with age as the covariate. We used the least significant difference test for post-hoc analyses.

As reported elsewhere,[14] gay/lesbian and bisexual high-school students in Seattle and British Columbia were more likely than heterosexual peers to report a history of sexual abuse or forced intercourse. To control for the potential confounding of sexual victimization and sexual orientation, further analyses included age and history of sexual abuse (British Columbia surveys) or forced sexual intercourse (Seattle surveys) as covariates. An interaction term of sexual orientation by sexual abuse was significant in all models except SEA95.

Because the heterosexual samples were large compared with the other sexual orientation samples, we were concerned this would artificially reduce the size of the

TABLE 3—Comparisons of Mean HIV Risk Scores by Orientation and Gender: British Columbia (1992, 1998, 2003) and Seattle, Wash (1995, 1999)

Data Set	Heterosexual	Mostly Heterosexual	Bisexual	Gay/Lesbian	Model R^2
Girls' age-adjusted mean HIV risk score (SE)					
BC92	7.97 (0.04)	6.94 (0.15)	8.75 (0.29)	21.86 (0.94)	0.11
BC98	5.82 (0.04)	9.19 (0.12)	18.54 (0.24)	16.65 (0.61)	0.12
BC03	6.02 (0.04)	12.25 (0.11)	16.26 (0.20)	11.99 (0.59)	0.14
SEA95	11.96 (0.27)	. . .	18.15 (1.32)	19.31 (3.26)	0.04
SEA99	9.64 (0.28)	. . .	25.18 (1.30)	17.65 (3.83)	0.08
Girls' mean HIV risk score (SE) adjusted for age, sexual abuse,[a] and abuse × sexual orientation interaction					
BC92					0.18
Abused	15.21 (0.09)	15.38 (0.30)	22.75 (0.57)	39.62 (1.37)	
Not	6.06 (0.04)	4.41 (0.16)	4.49 (0.32)	7.95 (1.20)	
BC98					0.18
Abused	13.51 (0.09)	17.00 (0.23)	28.15 (0.41)	26.47 (1.23)	
Not	4.52 (0.04)	6.48 (0.13)	14.41 (0.28)	14.08 (0.68)	
BC03					0.17
Abused	11.78 (0.11)	19.33 (0.22)	21.16 (0.32)	24.13 (1.08)	
Not	5.29 (0.04)	9.94 (0.13)	13.70 (0.24)	7.26 (0.69)	
SEA95					0.22
Abused	29.56 (0.66)	. . .	31.14 (2.35)	29.99 (4.64)	
Not	9.08 (0.27)	. . .	13.80 (1.38)	12.47 (3.78)	
SEA99					0.30
Abused	34.67(0.86)	. . .	53.27(2.41)	48.59(10.08)	
Not	7.56(0.26)	. . .	17.48(1.32)	14.06(3.56)	
Boys' age-adjusted mean HIV risk score (SE)					
BC92	9.69 (0.05)	6.71 (0.22)	18.38 (0.35)	39.08 (0.66)	0.09
BC98	6.82 (0.04)	7.68 (0.19)	17.97 (0.37)	24.48 (0.43)	0.07
BC03	6.74 (0.04)	5.65 (0.21)	15.20 (0.39)	7.76 (0.47)	0.09
SEA95	14.60 (0.32)	. . .	29.33 (2.12)	24.98 (3.05)	0.03
SEA99	11.97 (0.33)	. . .	37.01 (2.33)	30.74 (3.34)	0.08
Boys' mean HIV risk score (SE) adusted for age, sexual abuse,[a] and abuse × sexual orientation interaction					
BC92					0.18
Abused	15.21 (0.26)	15.38 (0.74)	22.75 (0.90)	39.62 (1.36)	
Not	6.06 (0.05)	4.41 (0.22)	4.49 (0.38)	7.95 (0.74)	
BC98					0.10
Abused	17.28 (0.25)	29.85 (0.69)	40.90 (0.77)	38.88 (0.90)	
Not	6.48 (0.04)	5.93 (0.20)	11.24 (0.41)	22.06 (0.49)	
BC03					0.10
Abused	16.10 (0.27)	10.76 (0.82)	25.58 (1.01)	25.06 (1.98)	
Not	6.52 (0.04)	5.00 (0.23)	13.79 (0.43)	6.97 (0.50)	
SEA95					0.10
Abused	34.14(1.31)	. . .	43.21(3.94)	57.76(8.07)	
Not	13.38(0.32)	. . .	22.89(2.41)	20.08(3.14)	
SEA99					0.23
Abused	43.00(1.43)	. . .	69.82(3.92)	67.30(6.03)	
Not	10.54(0.31)	. . .	23.49(2.54)	18.15(3.56)	

Note. BC92 = British Columbia, 1992; BC98 = British Columbia, 1998; BC03 = British Columbia, 2003; SEA95 = Seattle, 1995; SEA99 = Seattle, 1999.
[a]For BC92, BC98, and BC03, sexual abuse = sexual abuse history; for SEA95 and SEA99, sexual abuse = forced intercourse.

pooled standard error we used when comparing mean differences in the ANCOVA and thus, increase the risk for a Type I error. To test this concern, we drew 10 random subsamples of an equivalent number of heterosexual males and females in each Seattle cohort and compared their HIV risk scores with the other groups. We found the ANCOVA results from these smaller samples yielded similarly significant patterns of group differences in mean risk scores; therefore, the analyses reported here used the full samples.

RESULTS

Unadjusted prevalence comparisons by sexual orientation for each gender showed a significantly higher prevalence of all 7 risk behaviors among sexual minority (gay/lesbian, bisexual, and mostly heterosexual) adolescents compared with heterosexual peers, except for STD risk among lesbian girls in BC03 (data not shown). Notably, the prevalence of injection drug use among gay/lesbian and bisexual adolescents was strikingly higher than among their heterosexual and mostly heterosexual peers in each cohort (heterosexual females=0.8%–2.4%; mostly heterosexual females=1.6%–2.3%; bisexual females=2.9%–11.2%; lesbian females=3.5%–26.6%; heterosexual males=0.5%–4.1%; mostly heterosexual males=0%–3.9%; bisexual males=11.7%–32.1%; gay males=16.3%–29.5%). All χ^2 tests were significant for comparisons of injection drug use by sexual orientation.

Table 3 shows adjusted HIV risk score comparisons by sexual orientation for female students and male students, first with age as the covariate and then age and sexual abuse. Table 4 shows differences in mean scores between female students and male students of the same sexual orientation in each cohort. In most surveys, male students in each orientation group had higher age-adjusted mean HIV risk scores and larger standard errors compared with female students in the same orientation group; however, this was not always the case for mostly heterosexual females, bisexual females, and lesbian females in British Columbia. Gender differences in age-adjusted mean HIV risk scores were generally smaller among heterosexual and mostly heterosexual groups than among bisexual and gay/lesbian groups in each

TABLE 4—Differences in Mean HIV Risk Scores Between Boys and Girls by Sexual Orientation[a]

	Heterosexual	Mostly Heterosexual	Bisexual	Gay vs Lesbian
Differences in Age-Adjusted Mean HIV Risk Scores				
BC92	1.72	−0.23	10.08	17.22
BC98	0.99	−1.51	−0.58	7.83
BC03	0.87	−7.17	−1.51	−2.14
SEA95	2.65	. . .	11.18	5.67
SEA99	2.33	. . .	11.83	13.08
Differences in mean HIV risk scores adjusted by age and sexual abuse				
BC92				
Abused	4.40	−4.27	26.13	26.87
Not	3.25	1.94	7.89	23.12
BC98				
Abused	3.75	12.85	12.75	12.41
Not	1.96	−0.55	-3.17	7.97
BC03				
Abused	4.32	−8.57	4.42	0.93
Not	1.23	−4.94	0.09	−0.29
SEA95				
Abused	4.58	. . .	12.06	27.77
Not	4.31	. . .	9.09	7.62
SEA99				
Abused	8.34	. . .	16.55	18.71
Not	2.99	. . .	6.01	4.09

Note. BC92 = British Columbia, 1992; BC98 = British Columbia, 1998; BC03 = British Columbia, 2003; SEA95 = Seattle, 1995; SEA99 = Seattle, 1999.
[a] Boys' mean score minus girls' mean score.

cohort, with only 2 exceptions out of the 18 different sexual orientation/cohort groups—mostly heterosexual students in BC03 and bisexual students in BC98 (range of differences for all other groups: heterosexual adolescents= 0.99–2.65; mostly heterosexual adolescents= 0.23–1.51; bisexual adolescents=10.58–11.83; gay/lesbian adolescents=5.67–17.22).

All age-adjusted ANCOVA models shown in Table 3 were significant ($P<.001$). Gay/lesbian and bisexual males and females in each cohort had significantly higher age-adjusted HIV risk scores compared with their heterosexual peers, and they had higher scores than all but 1 cohort of mostly heterosexual peers (all omnibus sexual orientation effects significant at $P<.001$; all post-hoc analyses significant at $P<.05$ to $P<.001$ [data not shown]). Age-adjusted mean risk scores for bisexual teenagers also were significantly different from their gay/lesbian counterparts in BC92 and BC03, and bisexual and gay males' mean risk scores also differed in BC98, but mean risk scores did not significantly differ between Seattle gay/lesbian and bisexual students. The age-adjusted models of sexual orientation explained 3% to 9% of the variance in HIV risk scores among male adolescents and 4% to 14% of the variance among female adolescents.

Within each sexual orientation group in each cohort, students who had a history of sexual abuse had much higher mean HIV risk scores compared with their nonabused counterparts. Mean risk scores among nonabused gay/lesbian and bisexual students were still higher than among nonabused heterosexual and mostly heterosexual students in nearly all cohorts. Male students' risk scores were generally higher in all abuse and sexual orientation categories than female students' scores were in similar categories. Gender differences in scores were greatest among abused mostly heterosexual, bisexual, and most gay/lesbian groups in all 5 cohorts.

Models that included sexual abuse and age as covariates explained a much higher percentage of variance in mean scores than age-adjusted models alone did. The R^2 for models of male adolescents ranged from 0.10 to 0.23, and models of female adolescents ranged from 0.17 to 0.30. However, even with sexual abuse or forced intercourse as a covariate, sexual orientation still had an independent significant effect within all the models except SEA95 female students (individual F statistics for orientation among SEA95 girls: $P=.07$; all other models in all other cohorts: $P<.001$).

DISCUSSION

Gay/lesbian and bisexual adolescents in all 5 cohorts engaged in a greater number of serious HIV risk behaviors compared with heterosexual and mostly heterosexual adolescents. This higher likelihood of HIV risk behaviors among sexual minority students appears to be associated in part with a higher prevalence of sexual victimization. Sexual abuse accounted for a much higher percentage of the variance in HIV risk scores than sexual orientation alone did; however, there was a significant interaction between abuse and orientation, and abused sexual minority students reported higher scores compared with abused heterosexual counterparts. Generally, male adolescents in each sexual orientation category had higher age-adjusted HIV risk scores compared with female adolescents, although this was not consistently the case among mostly heterosexual and bisexual teenagers, especially among those who were not abused.

Thus, our hypotheses were supported for the most part: male students generally had higher risk scores compared with female students. Bisexual teenagers had higher risk scores compared with heterosexual teenagers, and they had scores that were mostly as high as or higher than those of their gay/lesbian peers. Sexually abused students had higher risk scores compared with nonabused students, although the sexually abused gay/lesbian and bisexual adolescents had the highest scores. These results were found in all 5 cohorts surveyed, across more than a decade. This suggests differences in risks by gender, sexual orientation, and abuse status for groups in the Pacific Northwest are relatively persistent over time.

These results mirror findings of other studies from the East Coast and the Midwest, where gay/lesbian and bisexual adolescents also were more likely to engage in HIV risk behaviors. The variation in risk scores between gay/lesbian students and bisexual students suggests that it may not be appropriate to combine gay/lesbian and bisexual adolescents into a single group when examining HIV-risk behaviors, which has been suggested by other studies.[10,12,17,21,22] However, the direction of risk was not consistent; in some cohorts in our study, gay/lesbian mean scores were higher, and in other cohorts, bisexual adolescents had the highest scores. The reason for such differences may be associated with youths' understanding of the meaning of these labels and each teenager's decision to choose either label.[23]

The HIV risk scores in general were higher among the Seattle students than among the British Columbian students. This is likely a result of age differences in overall samples; older adolescents are more likely to be sexually experienced, and most behaviors in the risk score were sexual risk behaviors. Although there may be cultural differences in sexual risk behaviors and substance use between the United

States and Canada in the Pacific Northwest, the differences also may be attributable to the type of samples: the Seattle cohorts were an exclusively urban sample, whereas the British Columbia cohorts included students from urban school districts within major cities, such as Vancouver and Victoria, and students from more remote regions of the province. If students in rural areas of British Columbia have less access to injection drugs, fewer opportunities for multiple sexual partners, or community norms that delay sexual intercourse debut, lower risk behaviors could attenuate overall mean scores. However, in regional analyses of their surveys, the McCreary Centre Society has generally noted higher levels of risk behaviors in rural regions compared with the greater Vancouver region.[25] It is not known whether a statewide Washington survey similar to the British Columbia survey would find similar HIV risk scores.

Strengths and Limitations

These cohorts were large-scale school-based samples of a Canadian province and a US metropolitan area in the Pacific Northwest; therefore, we had both adequate size and diversity to be able to disaggregate gay/lesbian students from bisexual students. They may provide a more accurate portrayal of HIV risk among self-identified gay/lesbian and bisexual students than venue-based studies provide, although the limited number of sexual behavior questions on such surveys also may underestimate levels of risk. However, the cohorts also included surveys that were more than a decade old, and shifts in behaviors over time may make them less accurate for current cohorts, especially in Seattle, where the last survey was conducted in 1999. The stability of associations across all the times, and a more recent 2003 survey in British Columbia, suggest that our findings are still relevant for students today.

An in-school population may not include adolescents who engage in the highest levels of HIV risk behaviors. Thus, our results may not be applicable to populations who are less likely to be in school, such as homeless and runaway adolescents. However, another recent study of gay/lesbian, bisexual, and heterosexual homeless youths in the Seattle area found results similar to ours.[13]

Unlike many school-based surveys, these 5 surveys included at least 1 measure of sexual abuse that allowed us to control for differences in abuse experiences among sexual orientation groups. As in other studies, sexual abuse history had a profound influence on HIV risk scores regardless of sexual orientation. The low R^2 results for models that only included age and sexual orientation suggest sexual orientation alone cannot account for the variance in risk behaviors; however, the interaction between sexual abuse and sexual orientation improved the R^2 considerably. Because gay/lesbian and bisexual adolescents are at increased risk for sexual victimization, it is important to control for sexual abuse, sexual assault, and forced intercourse when comparing risk behaviors between sexual minority adolescents and their heterosexual peers. This suggests that it is important to include a measure of sexual abuse in youth surveys.[14] However, Seattle's measure—forced intercourse—includes vaginal and anal intercourse, but it omits nonpenetration abuse behaviors and forced oral sex, which may still be psychologically traumatizing. Thus, there may be more gay/lesbian and bisexual students who have a history of sexual abuse than were identified by this item, which in turn may help explain high risk scores among gay/lesbian and bisexual students who had no forced intercourse. The surveys also did not identify age at sexual abuse onset or type, frequency, or severity of abuse, all of which may influence subsequent coping responses.[6,7]

It is important to recognize that most adolescents in each sexual orientation group reported low levels of HIV risk behaviors. Yet, these were cross-sectional surveys that represented a moment in time during adolescents' development. Although more than half of Seattle students and up to three fourths of British Columbia students were not sexually experienced, a sizable proportion of youths in all the sexual orientation groups will become sexually active during adolescence. The higher scores among gay/lesbian and bisexual students included greater likelihood of unprotected intercourse and multiple sexual partners, which indicates a need to help gay/lesbian and bisexual adolescents improve their skills for negotiating safer sexual practices. The sexual risk behavior measures were focused on heterosexual intercourse; sexual minority adolescents may not have identified unprotected same-gender sexual behaviors, even if those behaviors carry risk for HIV.[26] Survey developers should not assume that adolescents only engage in heterosexual behaviors, nor should items focus exclusively on heterosexual intercourse as the primary risk for HIV. Recent studies in Canada and the United States suggest adolescents use unprotected oral and anal intercourse as methods to avoid pregnancy,[27,28] and they may be less aware that these behaviors also carry risk. Although developmentally appropriate and scientifically accurate sexual health and HIV/AIDS education is taught in some schools, these curricula (1) may not include information specifically geared toward gay/lesbian and bisexual adolescents, (2) may not address risky sexual behaviors beyond penile-vaginal intercourse, and (3) may not include opportunities to practice negotiation skills regarding condom use and other safer sexual practices.

Conclusions

Our findings have several implications for intervention. First, we must promote greater community awareness of the risk for sexual victimization among gay/lesbian and bisexual adolescents. Such efforts should include interventions that prevent victimization and that encourage clinicians to routinely screen all youths for a history of sexual abuse or assault. Clinicians should identify gay/lesbian- and bisexual-friendly services in their communities, where sexual minority adolescents who disclose abuse can be referred.

Second, sexual health education in schools should assume students' sexual diversity and should address the specific needs of gay/lesbian and bisexual adolescents. Many sexual minority students are not publicly "out" during high school,[29] and they may not be reached through venue-based health education efforts. Because school attendance is mandatory until age 16 in most states and provinces, school is an optimal site for sexual health promotion among students, including sexual minority and questioning adolescents. Venue-based efforts are still important for reaching teenagers who are not attending school, because they may engage in more HIV risk behaviors.[13]

Because of the high proportion of injection drug use reported by gay/lesbian and bisexual

students in these surveys, health care providers should regularly screen for injection drug use among such adolescents. They may need access to gay/lesbian- and bisexual-focused drug treatment programs that address the societal stigma accorded nonheterosexual orientations and the trauma of sexual abuse and violence.

Finally, public health professionals must recognize that gay/lesbian and bisexual adolescents may have other-gender and same-gender sexual partners. Risk-reduction messages for sexual minority adolescents should include information about the risks of heterosexual intercourse, including unintended pregnancy, and information about barrier methods that reduce the risks for HIV and other STDs. ■

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Contributors

E. Saewyc originated the study, supervised all aspects of implementation, and led the writing. C. Skay guided the statistical analyses and development of the HIV risk score. K. Richens assisted with the Seattle analyses and contributed to the writing. E. Reis assisted with the literature review, the Seattle analyses, and the writing. C. Poon and A. Murphy assisted with the British Columbia analyses. All authors originated ideas, interpreted findings, and reviewed drafts of the article.

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Human Participant Protection

The institutional review board of the University of Minnesota and the behavioral research ethics board of the University of British Columbia reviewed and approved this project.

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